

5

## CLAIMS

What is claimed is:

1. A method of dynamically adjusting the transmission rate of a mobile station,  
comprising:

receiving periodic load indications from a base station;

10 calculating a load tracking value based on two or more periodic load indications;

determining a rate change probability as a function of the load tracking value;

and

selectively changing the transmission rate of the mobile station responsive to a  
current rate control command based on the rate change probability.

15 2. The method of claim 1 wherein calculating a load tracking value based on two or  
more periodic load indications comprises calculating a weighted average of two or more  
periodic load indications.

3. The method of claim 2 wherein the periodic load indication is received from said  
base station at a predetermined rate control interval, and wherein calculating a weighted  
20 average of two or more periodic load indications comprises calculating a weighted  
average of a current periodic load indication for a current rate control interval and at  
least one previous periodic load indication for a previous rate control interval.

4. The method of claim 2 wherein calculating a weighted average of two or more  
periodic load indications comprises calculating the weighted average with an exponential  
25 decay function.

5. The method of claim 1 wherein calculating a load tracking value based on two or  
more periodic load indications comprises calculating a running average of two or more  
periodic load indications over a sliding time window.

6. The method of claim 3 wherein the running average is a weighted average.

5     7.     The method of claim 1 wherein calculating a load tracking value based on two or more periodic load indications comprises evaluating a continuous load tracking function that converts discrete periodic load indications from the base station to a continuous load tracking value.

8.     The method of claim 1 wherein determining a rate change probability as a  
10    function of the load tracking value comprises calculating the rate change probability based on the distance of the load tracking value from a target load tracking value.

9.     The method of claim 8 wherein the rate change probability increases with distance over at least a defined range of load tracking values.

10.    The method of claim 9 wherein the rate change probability varies linearly over  
15    the defined range of load tracking values.

11.    The method of claim 10 wherein the defined range is the entire range of possible values of the load tracking function.

12.    The method of claim 1 wherein determining a rate change probability as a function of the load tracking value comprises scaling the load tracking value to generate  
20    the rate change probability.

13.    The method of claim 1 wherein the rate change probability is a continuous rate change probability.

14.    The method of claim 1 wherein determining a rate change probability as a function of the load tracking value comprises taking the load tracking value as the rate  
25    change probability over at least a defined range of load tracking values.

15.    The method of claim 1 wherein selectively changing the transmission rate of the mobile station responsive to a current rate control command based on the rate change probability comprises comparing the rate change probability to a random probability value, and adjusting the data transmission rate of the mobile station based on the  
30    outcome of the comparison.

- 5 16. The method of claim 1 further comprising:  
determining a sliding window in the range of possible load tracking values;  
comparing the load tracking value to the sliding window to obtain a comparison  
result; and  
determining the rate change probability based on an outcome of the comparison  
10 result.
17. The method of claim 16 wherein determining the rate change probability based  
on an outcome of the comparison result comprises setting the rate change probability  
dependent on whether the load tracking value is within the sliding window.
18. The method of claim 17 wherein setting the rate change probability dependent on  
15 whether the load tracking value is within the sliding window comprises setting the rate  
change probability to zero when the load tracking value is within the sliding window.
19. The method of claim 16 wherein determining a sliding window in the range of  
possible load tracking values comprises determining the position of the sliding window in  
the load tracking range dependent on the current transmission rate of the mobile station.
- 20 20. The method of claim 16 wherein determining a sliding window in the range of  
possible load tracking values comprises determining the position of the sliding window in  
the load tracking range dependent on the current transmission power of the mobile  
station
21. The method of claim 1 wherein determining a rate change probability is  
25 dependent on a user class associated with a user of the mobile station.
22. The method of claim 1 wherein determining a rate change probability is  
dependent on a quality of service criteria.
30. A mobile station comprising:  
a receiver for receiving periodic load indications from a base station;

5 a transmitter for transmitting signals to the base station at a variable data  
transmission rate dependent on the load indications;  
a controller to vary the data transmission rate of the mobile station, said  
controller operative to:  
calculate a load tracking value based on two or more periodic load  
10 indications;  
determine a rate change probability as a function of the load tracking  
value; and  
selectively change the data transmission rate of the mobile station  
responsive to a current rate control command based on the rate  
15 change probability.

31. The mobile station of claim 30 wherein the controller calculates the load tracking  
value by calculating a weighted average of two or more periodic load indications.

32. The mobile station of claim 31 wherein the periodic load indication is received  
from said base station at a predetermined rate control interval, and wherein the  
20 controller calculates the weighted average of a current periodic load indication for a  
current rate control interval and at least one previous periodic load indication for a  
previous rate control interval.

33. The mobile station of claim 31 wherein the controller calculates the weighted  
average with an exponential decay function.

25 34. The mobile station of claim 30 wherein the controller calculates the load tracking  
value by calculating a running average of two or more periodic load indications over a  
sliding time window.

35. The mobile station of claim 34 wherein the running average is a weighted  
average.

5 36. The mobile station of claim 30 wherein the controller calculates the load tracking value by evaluating a continuous load tracking function that converts discrete periodic load indications from the base station to a continuous load tracking value.

37. The mobile station of claim 30 wherein the controller determines a rate change probability based on the distance of the load tracking value from a target load tracking value.

38. The mobile station of claim 37 wherein the rate change probability increases with distance over at least a defined range of load tracking values.

39. The mobile station of claim 38 wherein the rate change probability varies linearly over the defined range of load tracking values.

15 40. The mobile station of claim 39 wherein the defined range is the entire range of possible values of the load tracking function.

41. The mobile station of claim 30 wherein the controller determines a rate change probability by scaling the load tracking value.

42. The mobile station of claim 30 wherein the rate change probability is a continuous rate change probability.

43. The mobile station of claim 30 wherein the controller takes the load tracking value as the rate change probability over at least a defined range of load tracking values.

44. The mobile station of claim 30 wherein the controller selectively changes the transmission rate of the mobile station by comparing the rate change probability to a random probability value, and adjusting the data transmission rate of the mobile station based on the outcome of the comparison.

45. The mobile station of claim 30 wherein the controller is further operative to:  
determine a sliding window in the range of possible load tracking values;  
compare the load tracking value to the sliding window to obtain a comparison

result; and

5           determine the rate change probability based on an outcome of the comparison  
              result.

46.     The mobile station of claim 45 wherein the controller sets the rate change  
probability dependent on whether the load tracking value is within the sliding window.

47.     The mobile station of claim 46 wherein the controller sets the rate change  
10    probability to zero when the load tracking value is within the sliding window.

48.     The mobile station of claim 45 wherein the controller determines a sliding window  
in the range of possible load tracking values dependent on the current transmission rate  
of the mobile station.

49.     The mobile station of claim 45 wherein the controller determines a sliding window  
15    in the range of possible load tracking values dependent on the current transmission  
power of the mobile station

50.     The mobile station of claim 30 wherein the controller determines a rate change  
probability dependent on a user class associated with a user of the mobile station.

51.     The mobile station of claim 30 wherein the controller determines a rate change  
20    probability dependent on a quality of service criteria.